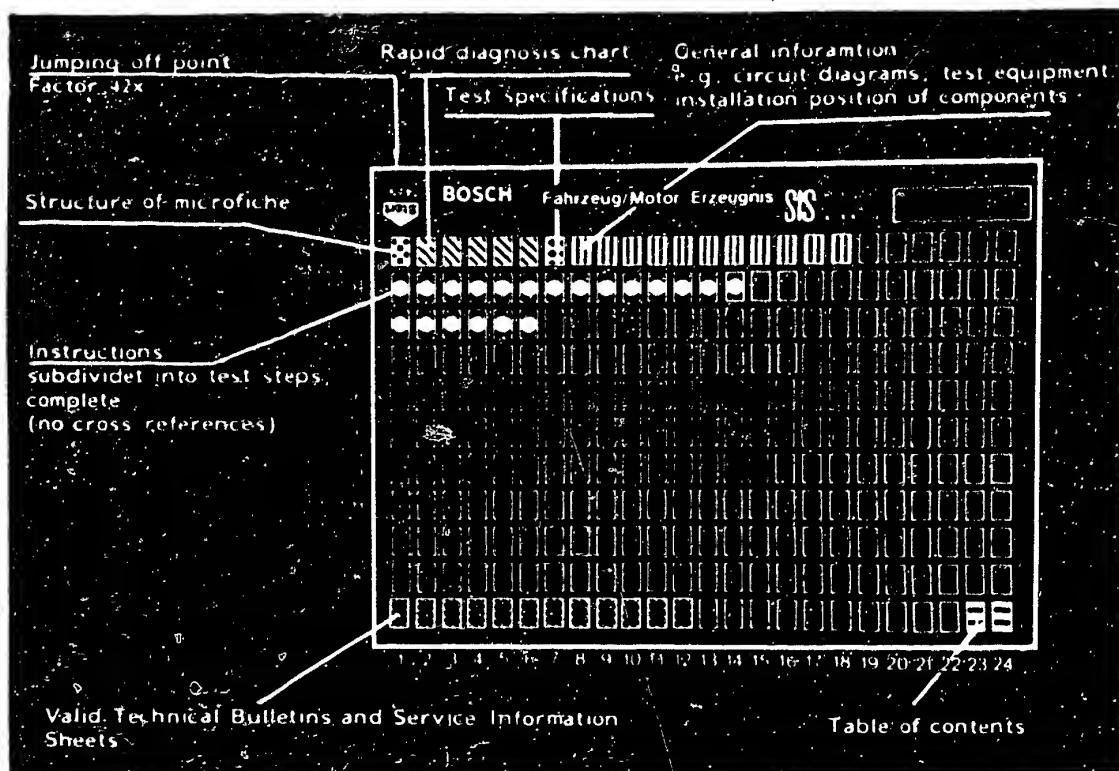


## Structure of microfiche



1. Read from left to right

2. Title of microfiche (appears on each coordinate)

<b>E 16</b>	Product/assembly/test step	
	Vehicle/engine	

Coordinate

3. Limits of section



Beginning



Mid-section



End



One-page section

4. References to relevant test steps in test specifications; coordinate e.g. C 6

**C 6**

**A1**

Trouble-shooting program



## 1. Rapid diagnosis chart

The following rapid diagnosis chart makes it possible for the experienced expert to quickly check the electrical/electronic part of the ignition system using normal workshop test equipment.

The rapid diagnosis chart contains the following information:

- Customer complaint
- Cause of the trouble
- Test instructions (if no coordinate given on the right, further possibilities for testing are indicated).
- Coordinates for detailed trouble-shooting.

If detailed information and instructions on trouble-shooting are necessary, always proceed according to the trouble-shooting program starting on coordinate B 1.



# Rapid diagnosis chart

Customer complaint (symptom of trouble)

1. Starting motor operates, but engine fails to start
  2. Rough idling
    3. Poor throttle response
      4. Engine lacks power
        5. Misfiring
          6. Fuel consumption too high
            7. Engine pings when accelerating
              8. Backfiring
                9. Engine becomes too hot

										Cause of trouble	Test instructions	Coordinates
●	●	●	●	●	●		●			Spark plugs defective	Assess using ignition oscillograms or remove spark plug and make visual examination.	---
●	●	●	●	●	●	●	●	●		Ignition timing incorrect	See Autodata test specifications	---
●	●	●	●	●						Shunt on secondary side	Assess ignition coil, ignition distributor, ignition harness and spark plug using ignition oscillogram or make visual examination	---
●	●	●	●	●						Open circuit on secondary side	Assess ignition coil, ignition distributor, ignition harness and spark plug using ignition oscillogram, or test for continuity using ohmmeter	---
●										Open circuit on primary side	Test voltage supply to trigger box and primary circuit.	C 3
●	●	●	●	●						Ignition coil defective	Make visual examination, electrical test.	B 5

A3

Rapid diagnosis chart  
Mercedes-Benz



A4

Rapid diagnosis chart  
Mercedes-Benz



# Rapid check list

Customer complaint (fault characteristic)

1. Starting motor turns, engine does not start
2. Uneven idle
3. Poor throttle take-up (transitional fault)
4. Bad engine performance
5. Engine misses
6. Fuel consumption too high
7. Engine pings during acceleration
8. Engine misfires
9. Engine becomes too hot

									<u>Cause of fault</u>	<u>Hints on testing</u>	<u>Coordinates</u>
		●	●	●	●				Interference-suppression resistors not OK	Judge by means of ignition oscilloscope or resistance measurement	---
●	●	●			●	●	●	●	Centrifugal advance not OK	See Autodata test specifications	---
		●	●		●	●		●	Vacuum advance not OK	See Autodata test specifications	----
●									Trigger box not OK	Peak-coil current switched off, check primary voltage	B11 B13
●									Ignition-distributor pulse-generator not OK	Test resistance and ground connection of winding element. Test ignition-pulse generator for mechanical damage.	C 1
●	●	●	●	●					Rotational speed limiter not OK	Test switch-off speed or make visual check	---
●									Ignition sequence not OK	See Autodata test specifications	---

**A5**

Rapid check list

Mercedes-Benz



**A6**

Rapid check list

Mercedes-Benz



## 2. Test specifications

Ignition coil primary 0.5...0.8  $\Omega$

**B5**

Ignition coil secondary 8.7...14.5 k  $\Omega$

Voltage supply

Ignition coil at  
engine idle speed  $\geq 10$  V

**B9**

Peak-coil current switch  
off approx.

5 V

approx. 1 s after

0 V

**B11**

Primary voltage at  
engine idle speed

220...270 V

**B13**

Resistance of  
winding element

470...820  $\Omega$

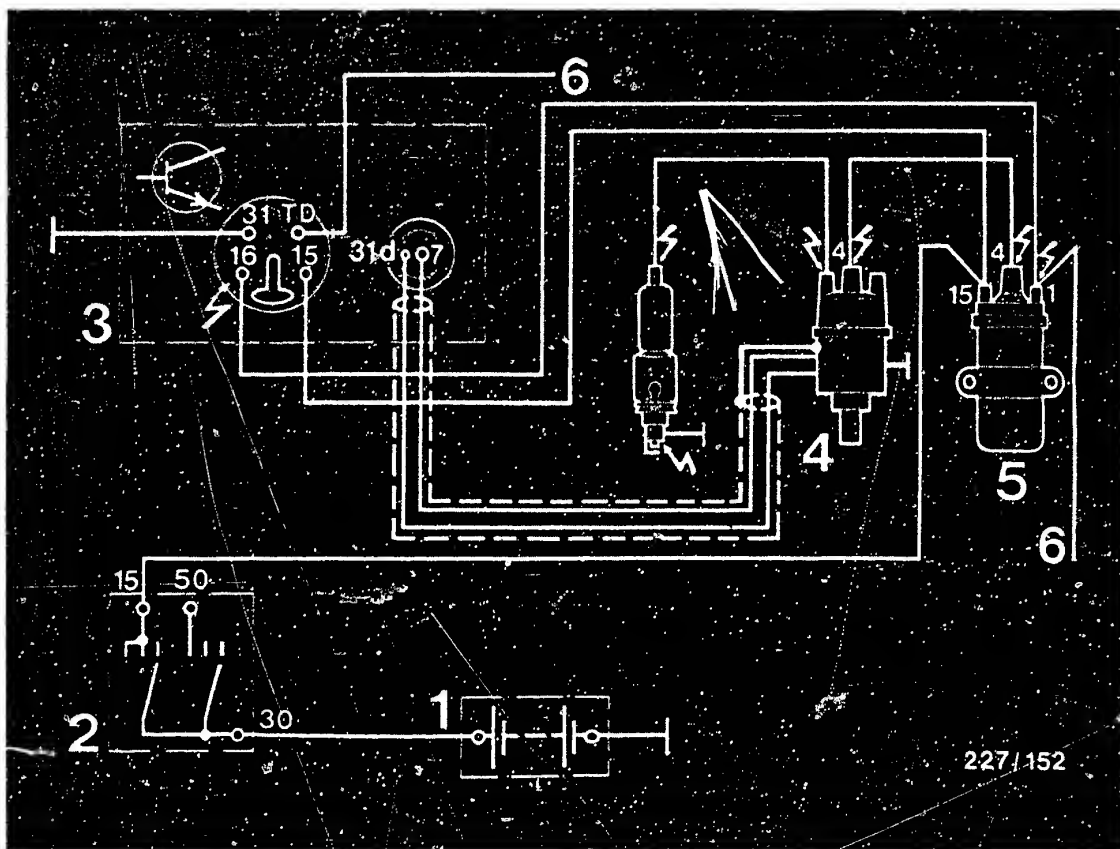
**C1**

Ground connection  
from winding element

$R = \infty$

See Autodata test specifications for setting values for ignition, idle speed, exhaust-gas, valve play, etc..



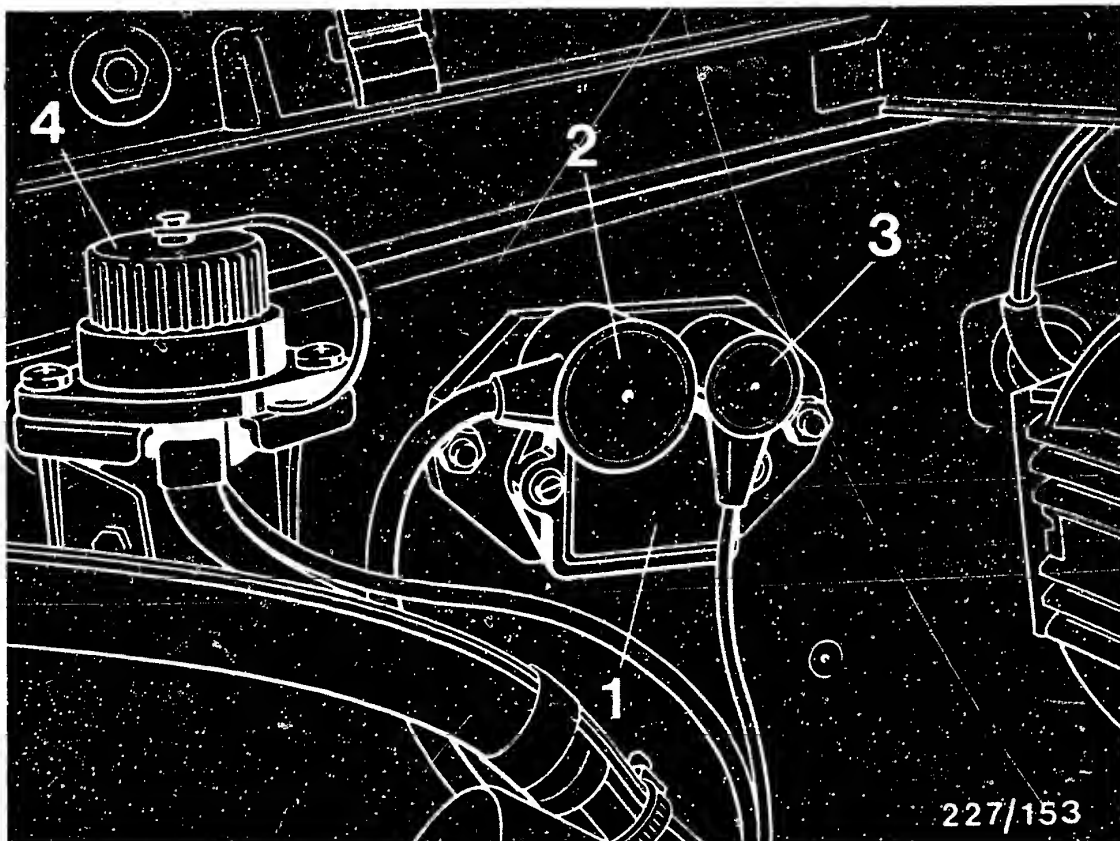


227/152

- |                                  |                          |
|----------------------------------|--------------------------|
| 1 = Battery                      | 4 = Ignition distributor |
| 2 = Ignition and starting switch | 5 = Ignition coil        |
| 3 = Trigger box                  | 6 = To diagnostic socket |

⚡ = Dangerous voltages (400 V - 25 kV)

### 3. Electrical connections



1 = Trigger box  
2 = Trigger-box plug

3 = Trigger-box plug -  
vane switch lead  
4 = Diagnostic plug

#### 4. Location of components

The trigger box is on the left-hand wheel house in the engine-compartment and differs from that shown in the illustration according to the particular type of vehicle.

## 5. Necessary test equipment and aids

Motortester e.g.	MOT 2 01	0 684 000 201
Spark gap e.g. ignition-coil capacitor tester	EFAW 106 A	0 681 100 001
or Single spark gap tester	EF 1177/7	1 684 531 000
Sleeve type suppressor 5 kΩ		0 356 500 001
Ohmmeter or e.g.	ETE 014.00 Pontavi Wh-2	0 684 101 400 commercially available
Voltmeter e.g.	ETE 014.00	0 684 101 400
Heat conducting paste		5 942 860 003
Test prods		commercially available





## 6. Danger of accident on electronic ignition systems

Increased demands of modern engines on the ignition system combined with the desire for freedom of maintenance have recently led to electronic ignition systems being fitted as standard. Usually the ignition power of electronic systems (of almost all manufacturers) is higher than that of conventional systems, and there are signs of further increases in power. Electronic ignition systems thus reach a power range which can be highly dangerous if live parts or terminals are touched (both on the primary as well as the secondary sides).

In this connection we should like to point out that the VDE regulations, in particular VDE 0104/7.67 and/or the respective national regulations must be followed when testing or working on the ignition system.

The ignition should always be switched off when working on the ignition system (switch off ignition or voltage source). Such work includes:

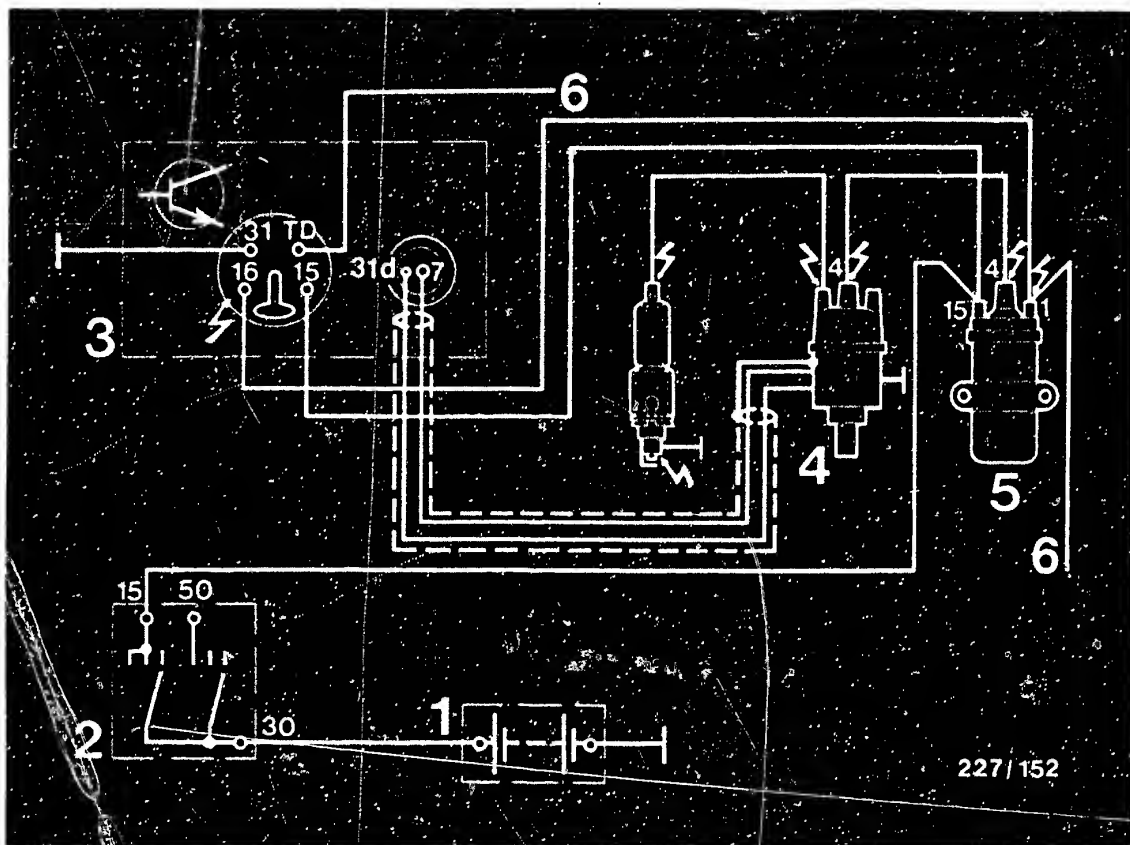
- Connecting of engine test equipment (timing light, dwell-tach tester, ignition oscilloscope, etc.).
- Replacing parts of the ignition system (spark plug, ignition coil, ignition distributor, H.T. ignition cable, etc.).



If, while testing the ignition system or during adjustment work on the engine (e.g. carburettor), it becomes necessary to switch on the ignition (switch on ignition or voltage source), the above-mentioned dangerous voltages occur over the entire system.

The danger of accident exists, therefore, not only on the individual assemblies of the ignition system (e.g. ignition distributor, ignition coil, trigger box, ignition harness), but also on the wiring harness (e.g. tachometer connection, diagnostic plug), at plug-in connections and test equipment.





- |                                  |                          |
|----------------------------------|--------------------------|
| 1 = Battery                      | 4 = Ignition distributor |
| 2 = Ignition and starting switch | 5 = Ignition coil        |
| 3 = Trigger box                  | 6 = To diagnostic socket |

**⚡** = Dangerous voltages (400 V - 25 kV)

### Electrical connections

Taking the example of the connections diagram for an electronic ignition system, the dangerous parts are marked with high-tension arrows.



7. False indication of engine speed, dwell angle and  
ignition timing point

With ignition systems with trigger box 0 227 100 114 (TI-i) with current limitation, there may be a false indication of engine speed, dwell angle and ignition timing point on the tester.

For further details see coordinates L7 - L11.



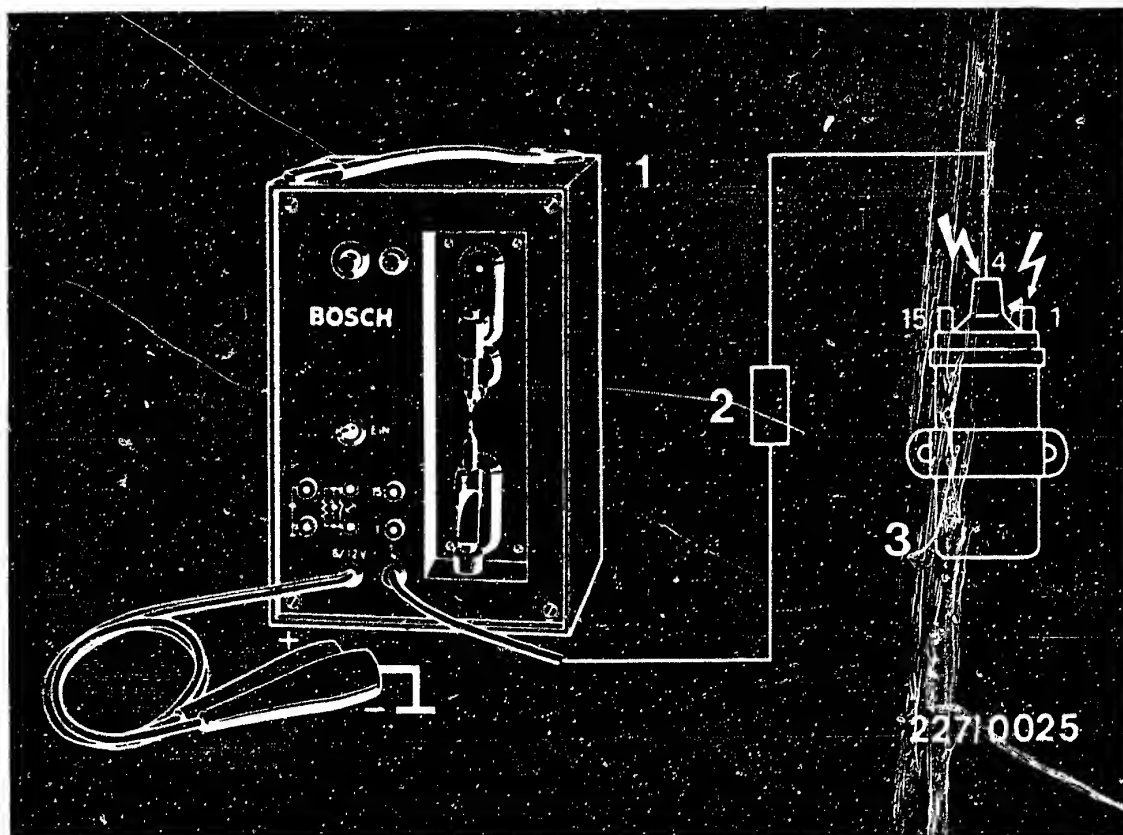
## 8. Important vehicle information

- During the compression test, either pull off the trigger-box plug or firmly connect terminal 4 of the ignition coil to ground using an extra cable (dangerous voltages, insulation damage at ignition coil, ignition distributor or ignition harness).

Note: The extra cable must be suppressed with at least  $2\text{ k}\Omega$  0 356 500 001.

- Resistance measurements must only be performed with the ignition switched off or with the battery disconnected (measuring instrument defective).
- In order to prevent the trigger box from being irreparably damaged, the secondary side of the ignition system must have at least  $2\text{ k}\Omega$  interference suppression whereby the original distributor rotor with  $1\text{ k}\Omega$  interference-suppression resistor must be fitted (even in the case of radio and spark interference suppression do not use a  $5\text{ k}\Omega$  distributor rotor).






1 = Spark gap

2 = 5 k $\Omega$  sleeve-type suppressor

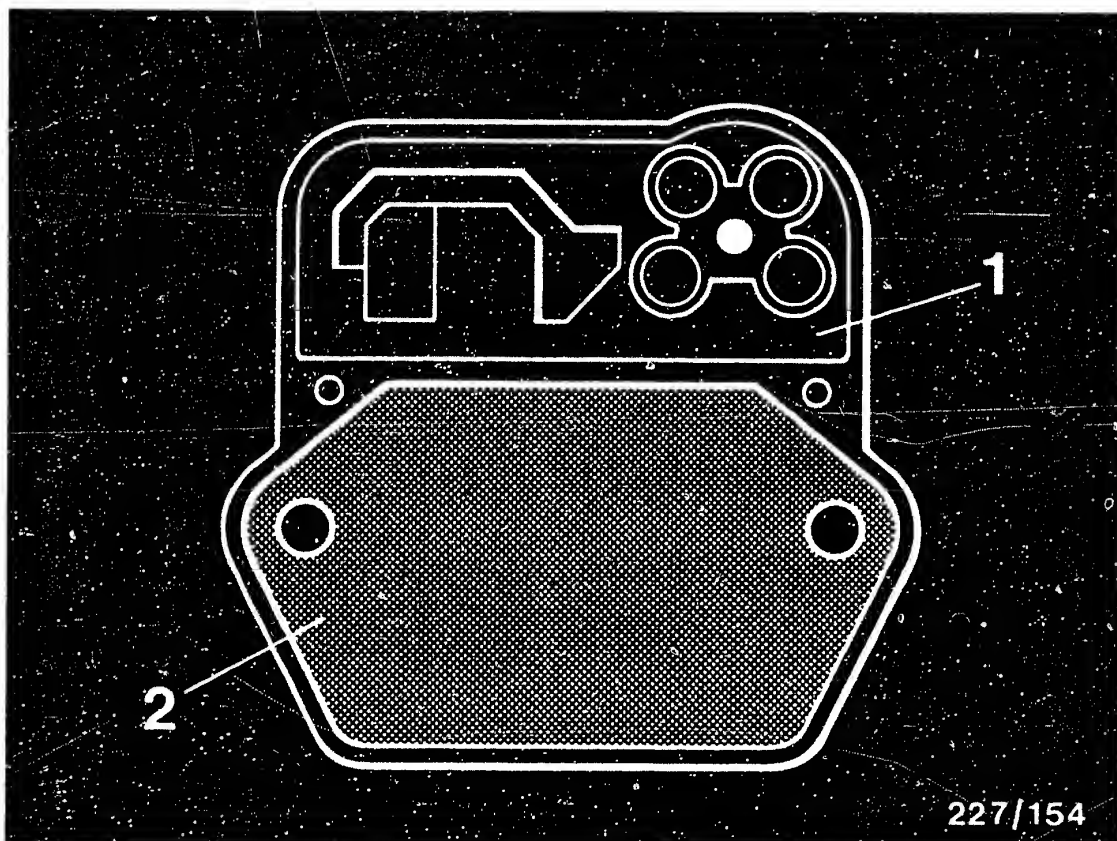
3 = Ignition coil

 = Dangerous voltages (400 V - 25 kV)

- In order to prevent the trigger box from being irreparably damaged, when using a spark gap, an interference-suppression resistor of at least 2 k $\Omega$  must be connected between the spark gap and ignition coil terminal 4, e.g. sleeve-type suppressor (5 k $\Omega$ ) 0 356 500 001.
- In the case of ignition distributors with engine-speed limitation the ignition distributor side terminal 4 must have 1 k $\Omega$  interference suppression. Operation without interference suppression will lead to the destruction of the trigger box.

- Do not disconnect battery while the engine is still running.
- Both the trigger box and the ignition coil will be destroyed if the battery poles are incorrectly connected.
- Starting aids with more than 16 V or fast chargers are not permitted.
- The prescribed ignition coil (see part number) must not be replaced with a different kind of ignition coil.
- No interference-suppression capacitor must be connected to ignition coil terminal 1.
- Ignition coil terminal 1 must not be connected to ground as a precaution against theft (the ignition coil will be destroyed when the ignition is switched on).
- Ignition coil terminal 1 must not be connected either to the positive terminal of a battery or to a test lamp (trigger box will be destroyed).
- The ignition cable from ignition coil terminal 4 to the ignition distributor must not be pulled off during operation.
- The cable between the inductive pickup and the trigger box must be screened (to avoid malfunctioning of the trigger box).





1 = Trigger box  
2 = Base plate

- Before the trigger box is fitted, its base plate must be coated with thermal conduction paste. Only use an appropriate object to apply the paste (screwdriver, matchstick etc.). Thermal conduction paste is not to come into contact with painted surfaces.





## 9. Trouble-shooting program

### Procedure

The trouble-shooting program is divided into 3 rows of boxes.

The left-hand row contains test instructions and test specifications.

The center row contains repair instructions.

The right-hand row contains the illustrations/terminal diagrams belonging to the text and the explanation of the items in the picture.

If the questions asked in the left-hand row can be answered conclusively with "Yes", then proceed to the next test down.

If the answer to the question is "No", branch to the center row and carry out the tests given there.

Before testing, make sure of the following:

Battery fully charged, fuel system O.K., engine mechanically O.K. (e.g. compression, valve clearance etc.).  
Ambient temperature/ignition system temperature 0° to +100°C (temperature has a considerable effect on measured values).



Beginning of trouble-shooting program

Starting motor operates, engine fails to start  
or misfires or lacks power.

Yes

Continued on B 3

**B2**

Trouble-shooting program

Mercedes-Benz



yes

Test the primary signal. If no speed tester or oscilloscope is available, check that there is a spark at the spark gap.

Primary signal with oscilloscope  
Connect oscilloscope to ignition coil according to operating instructions.  
Oscilloscope must show a primary voltage (of whatever height).

Primary signal with speed tester  
Connect speed tester to ignition coil according to operating instructions.  
Start the engine.  
Speed tester must show a value (of whatever height).

Ignition spark with spark gap  
Disconnect ignition cable terminal 4 from ignition coil.  
Connect spark gap including sleeve-type suppressor (5 k $\Omega$ ) to ignition coil. Set spark gap to 5 mm.  
Start the engine.  
There must be sparks at the spark gap.

Is there a primary signal or ignition spark at the spark gap?

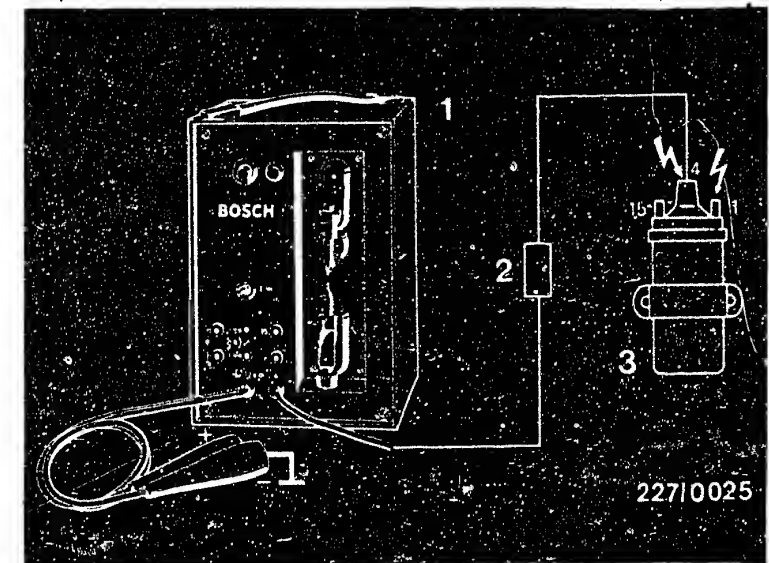
yes

Continued on B5/B6

no

If there is no primary signal or no ignition spark, then continue the test at C.1.

The tests as from B 5 are not necessary.



- 1 = Spark gap
- 2 = Sleeve-type suppressor  
5 k $\Omega$
- 3 = Ignition coil

⚡ = Dangerous voltages  
(400 V - 25 kV)

**B3**

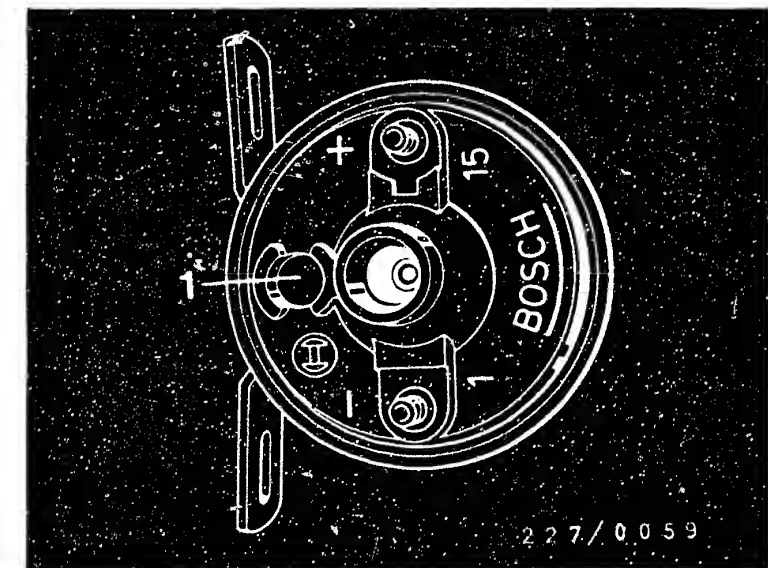
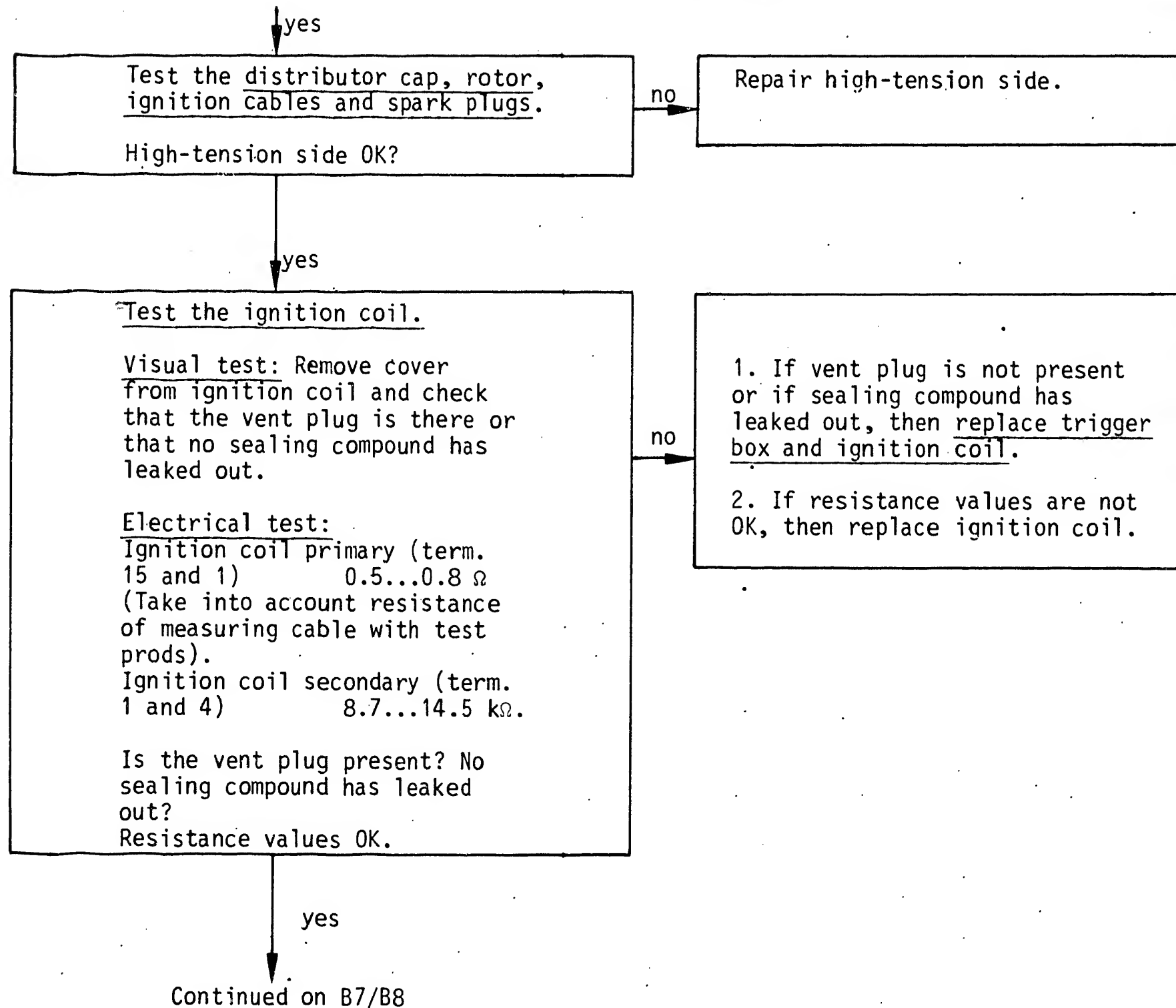
Trouble-shooting program  
Mercedes-Benz



**B4**

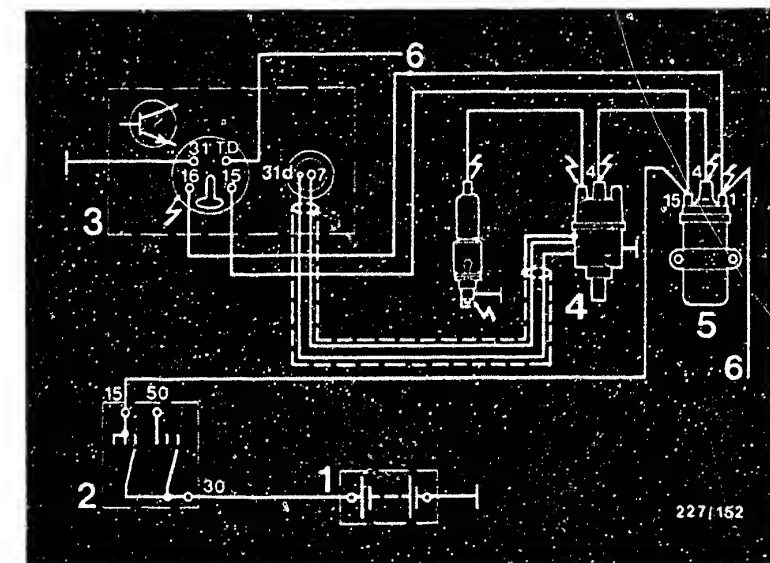
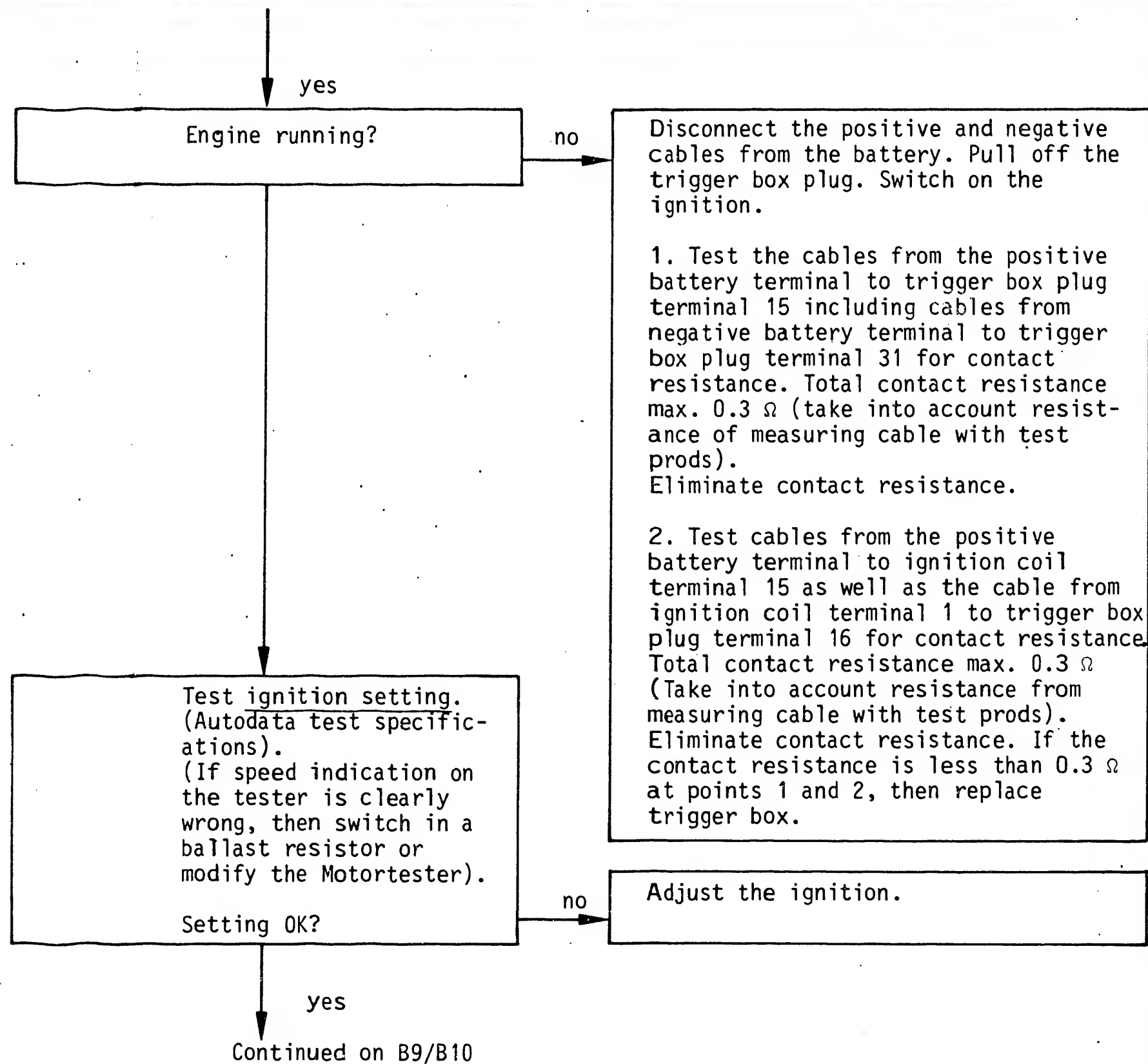
Trouble-shooting program  
Mercedes-Benz





1 = Plug

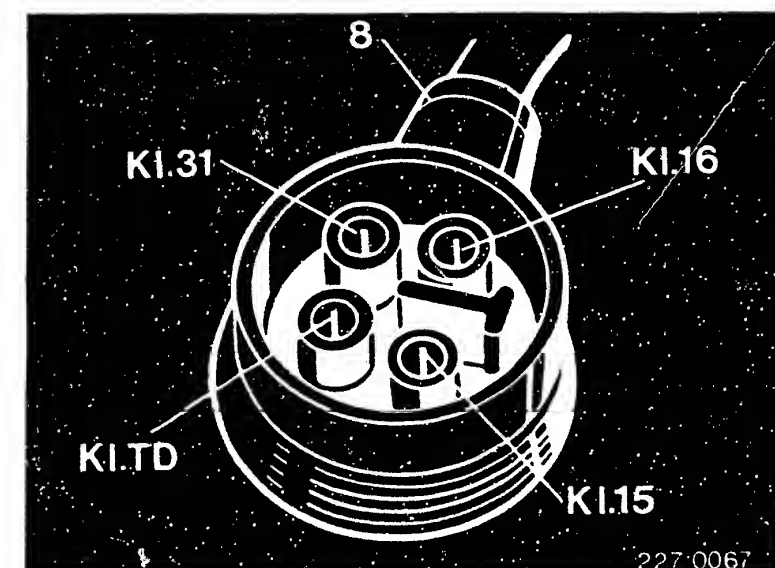




- 1 = Battery
- 2 = Ignition and starting switch
- 3 = Trigger box
- 4 = Ignition distributor
- 5 = Ignition coil
- 6 = To diagnostic socket

⚡ = Dangerous voltages  
(400 V - 25 kV)

8 = Trigger-box plug



**B7**

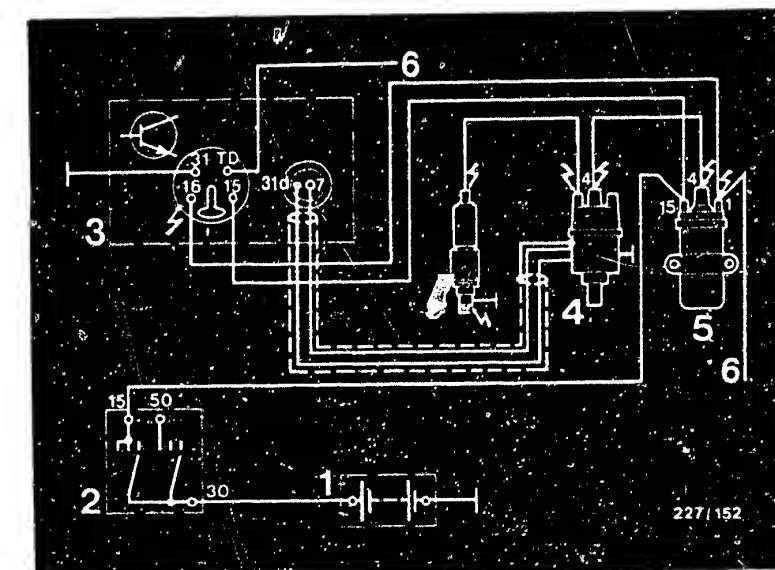
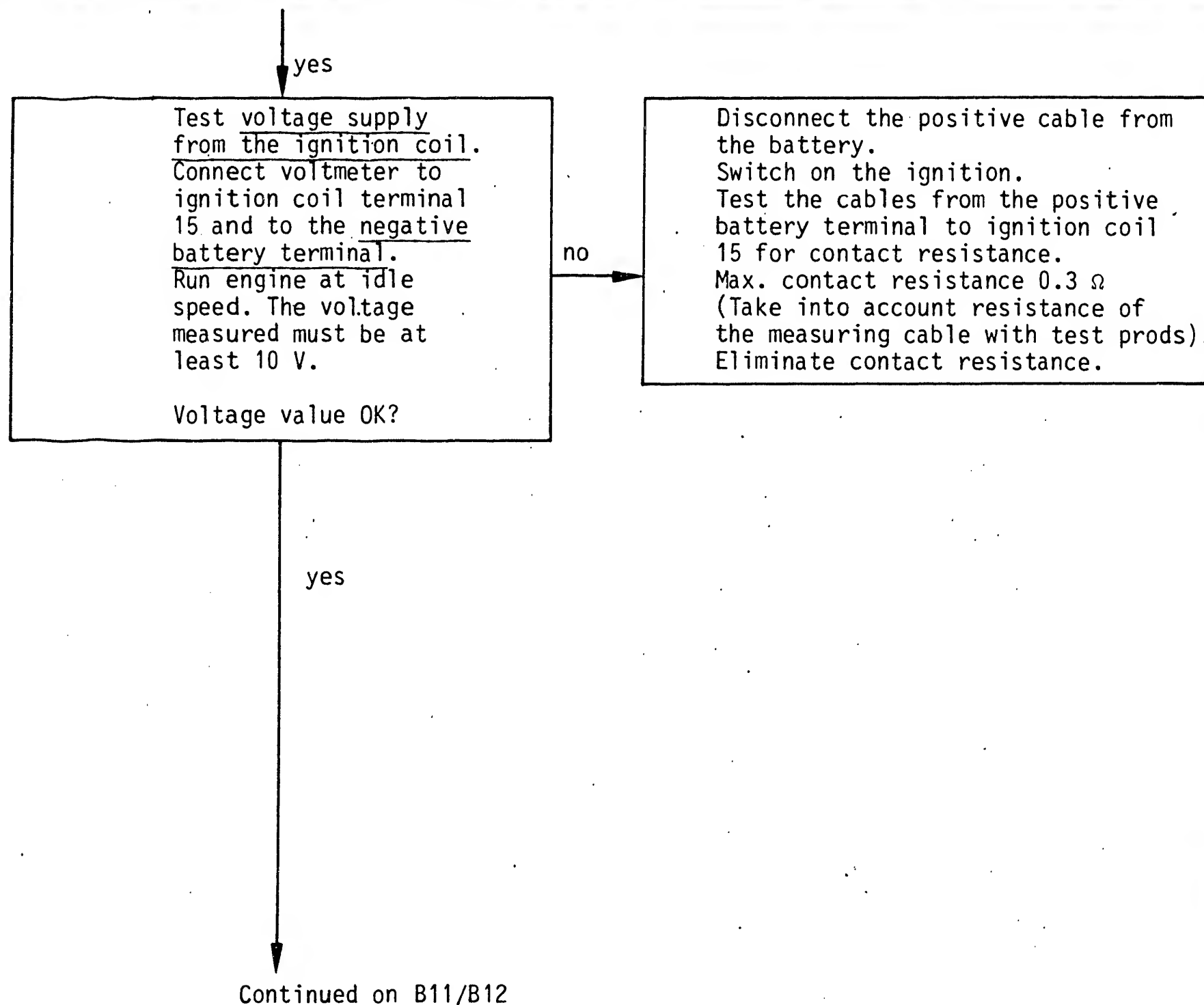
Trouble-shooting program  
Mercedes-Benz



**B8**

Trouble-shooting program  
Mercedes-Benz

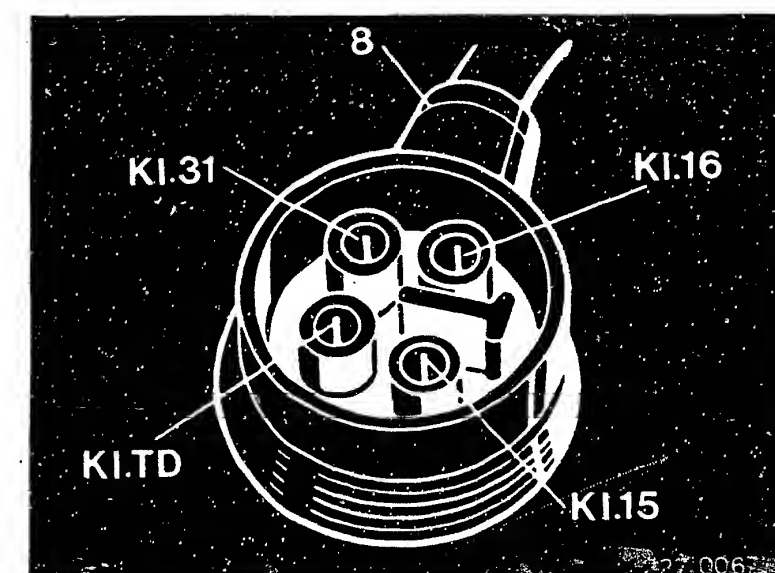




- 1 = Battery
- 2 = Ignition and starting switch
- 3 = Trigger box
- 4 = Ignition distributor
- 5 = Ignition coil
- 6 = To diagnostic socket

⚡ = Dangerous voltages  
(400 V - 25 kV)

8 = Trigger-box plug



**B9**

Trouble-shooting program  
Mercedes-Benz



**B10**

Trouble-shooting program  
Mercedes-Benz



yes

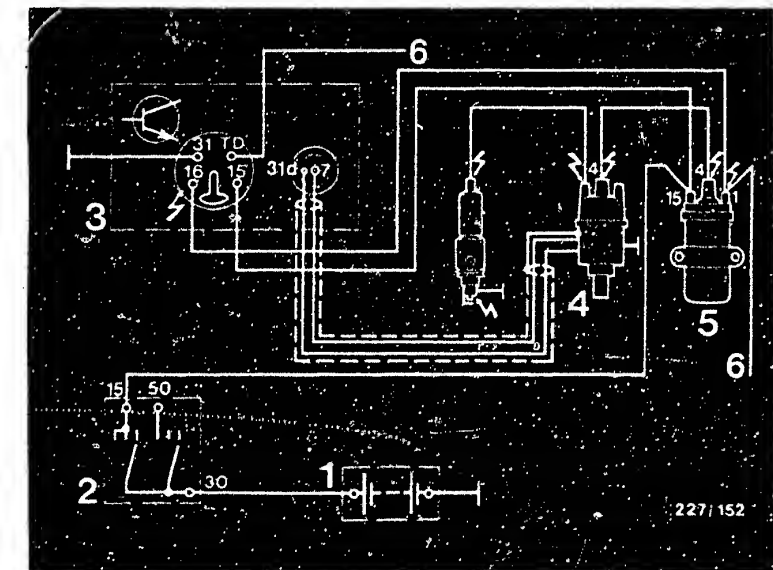
Test peak-coil current.  
Connect voltmeter to ignition  
coil terminals 15 and 1. Switch  
on ignition.  
The voltmeter shows a slight  
deflection for approx. 1 s  
(approx. 5 V). The voltmeter  
must then show 0 V again.  
Voltage value (0 V) OK?

no

Replace trigger box ignition  
coil.

yes

Continued on B13/B14



- 1 = Battery
- 2 = Ignition and starting  
switch
- 3 = Trigger box
- 4 = Ignition distributor
- 5 = Ignition coil
- 6 = To diagnostic socket

⚡ = Dangerous voltages  
(400 V - 25 kV)

**B11**

Trouble-shooting program

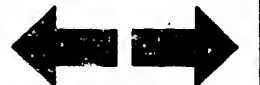
Mercedes-Benz



**B12**

Trouble-shooting program

Mercedes-Benz



yes

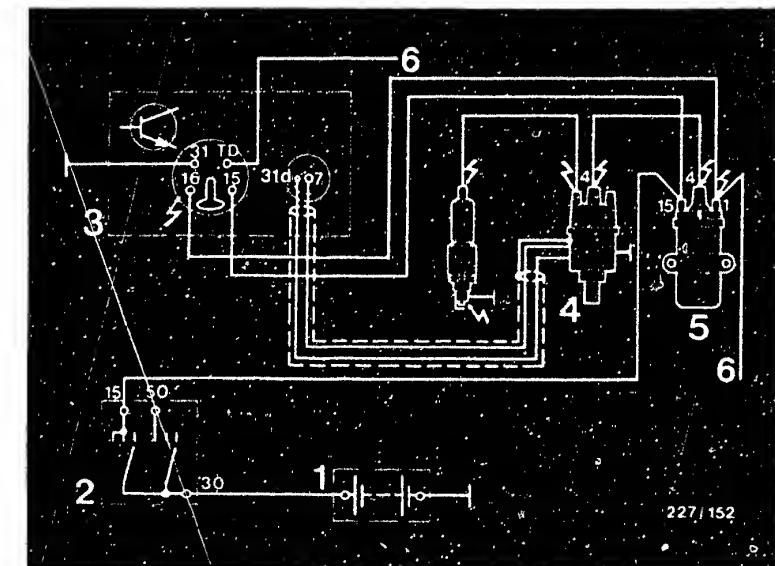
Test the primary voltage (if MOT series is available). Connect oscilloscope e.g. MOT 2 01 to the ignition in accordance with the operating instructions. Run the engine at idle speed. The primary voltage measured must be 220...270 V. See drawing. Voltage value OK?

no

Replace trigger box.

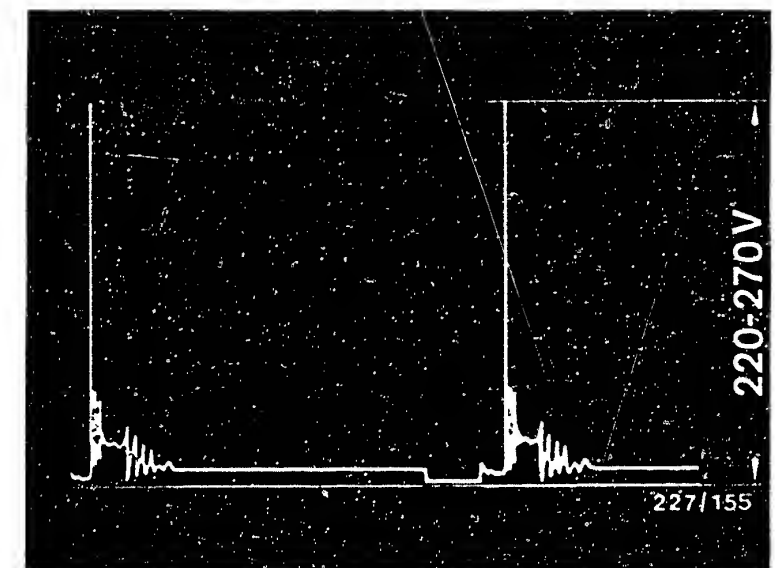
yes

Ignition system OK.  
Test completed.  
Tests as from C 1 no longer necessary.  
Please note:  
If the customer's complaint is not eliminated, then there are further faults in the fuel system or the engine is not mechanically OK.



- 1 = Battery
- 2 = Ignition and starting switch
- 3 = Trigger box
- 4 = Ignition distributor
- 5 = Ignition coil
- 6 = To diagnostic socket

⚡ = Dangerous voltages  
(400 V - 25 kV)



**B13**

Trouble-shooting program  
Mercedes-Benz



**B14**

Trouble-shooting program  
Mercedes-Benz





No primary signal or ignition spark.  
(Continued from B 3)

yes

Test resistance of winding element including electric cable.

Disconnect the pickup cable from the trigger box plug. Connect the ohmmeter to the detached trigger-box plug between terminals 31d and 7.

Ohmmeter must show 470...820  $\Omega$ .

Resistance value OK?

no

Replace winding element/ignition coil or electric cable.

yes

Test ground connection of winding element and electric cable.

Connect the ohmmeter to the disconnected trigger-box plug at terminal 31d or terminal 7 and vehicle ground. The ohmmeter must show ( $\infty$ ) continually.

Resistance value ( $\infty$ ) OK?

no

Replace winding element/ignition coil or electric cable.

yes

Test ignition pulse generator for mechanical damage.

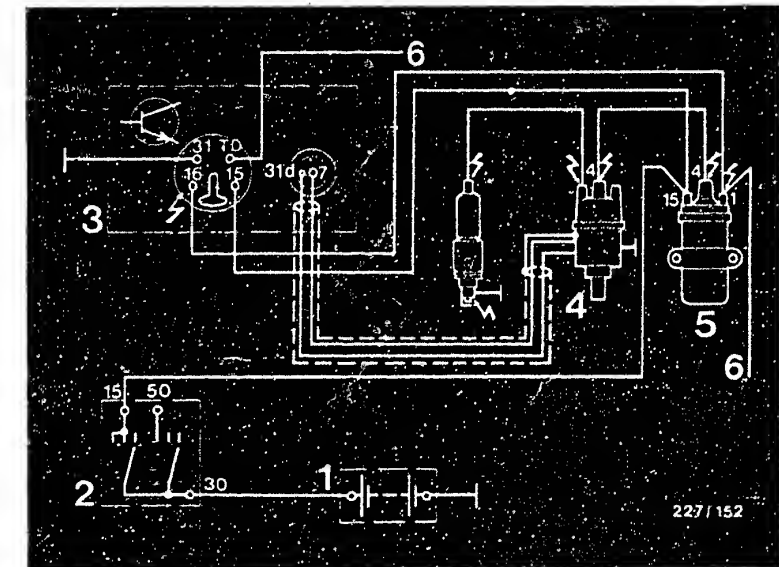
Visual test: The timer core must not brush against the teeth of the ignition pulse generator. Ignition pulse generator OK?

no

Replace ignition pulse generator/ignition distributor.

yes

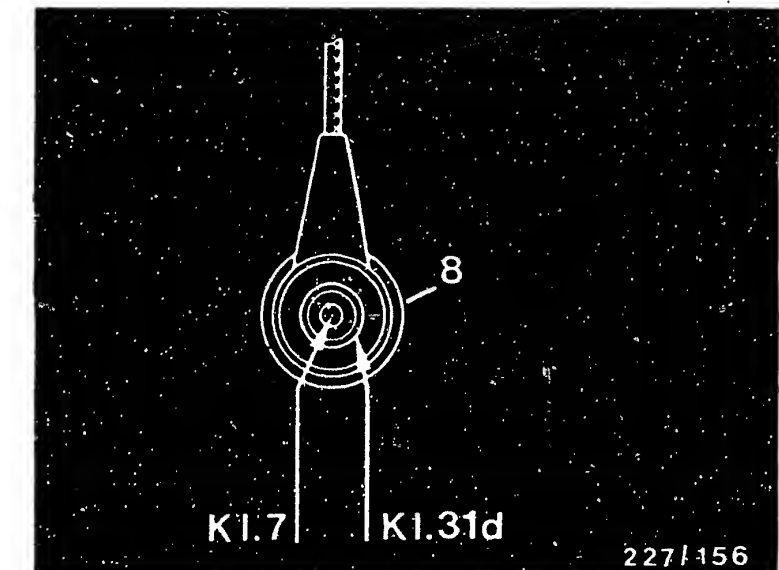
Continued on C3/C4



- 1 = Battery
- 2 = Ignition and starting switch
- 3 = Trigger box
- 4 = Ignition distributor
- 5 = Ignition coil
- 6 = To diagnostic socket

⚡ = Dangerous voltages  
(400 V - 25 kV)

8 = Trigger-box plug pickup cable



C1

Trouble-shooting program

Mercedes-Benz

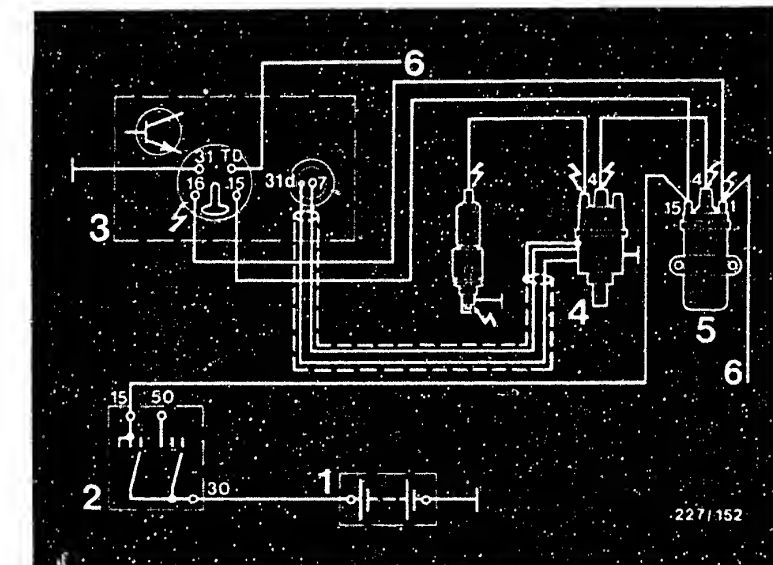
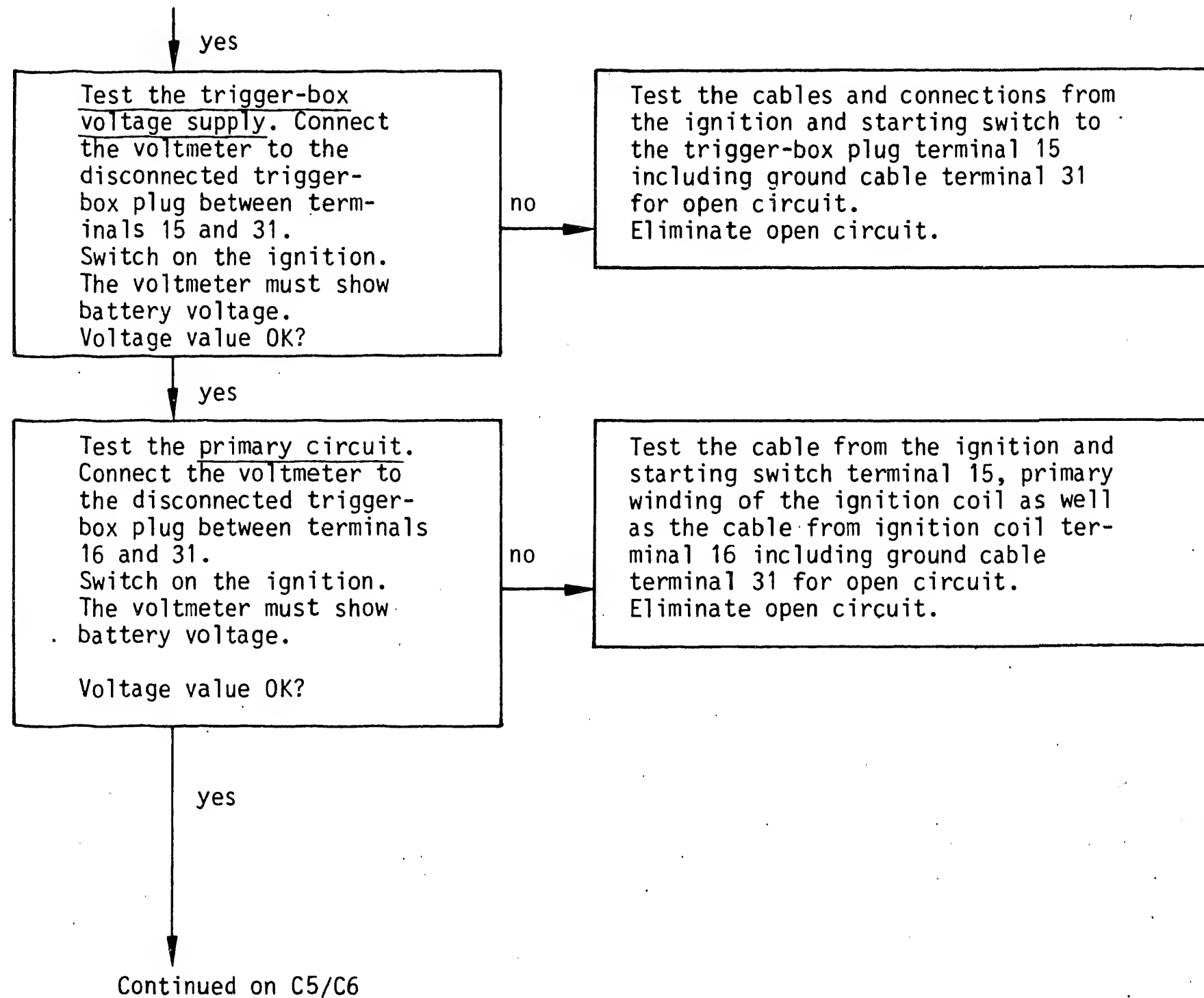


C2

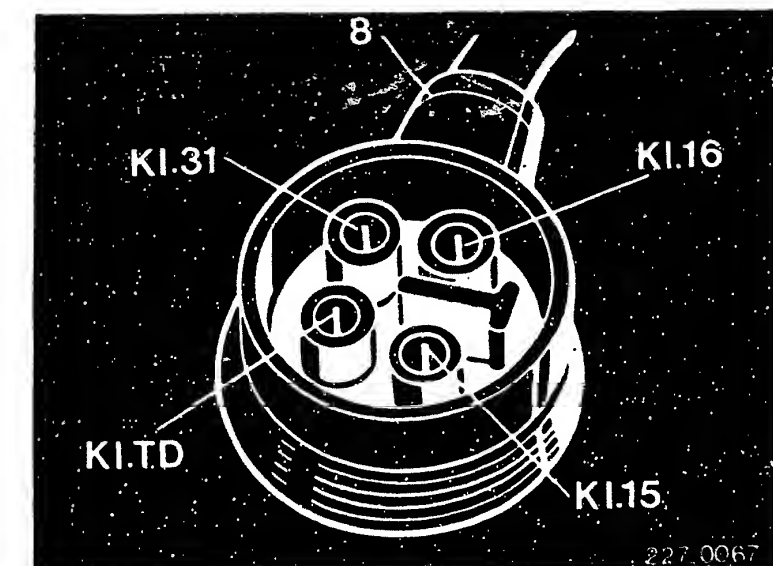
Trouble-shooting program

Mercedes-Benz





- 1 = Battery
- 2 = Ignition and starting switch
- 3 = Trigger box
- 4 = Ignition distributor
- 5 = Ignition coil
- 6 = To diagnostic socket
- ⚡ = Dangerous voltages (400 V - 25 kV)
- 8 = Trigger-box plug



**C3**

Trouble-shooting program  
Mercedes-Benz



**C4**

Trouble-shooting program  
Mercedes-Benz



yes

### Test ignition coil.

Visual test: Remove cover from ignition coil and check to see that the vent plug is there (see drawing) or that no sealing compound has leaked out.

### Electrical test:

Ignition coil primary (terminals 15 and 1) 0.5...0.8  $\Omega$   
(Take into account measuring cable with test prods).  
Ignition coil secondary (terminals 1 and 4) 8.7...14.5 k $\Omega$

Is vent plug present or have you checked that no sealing compound has escaped?

Resistance value OK?

yes

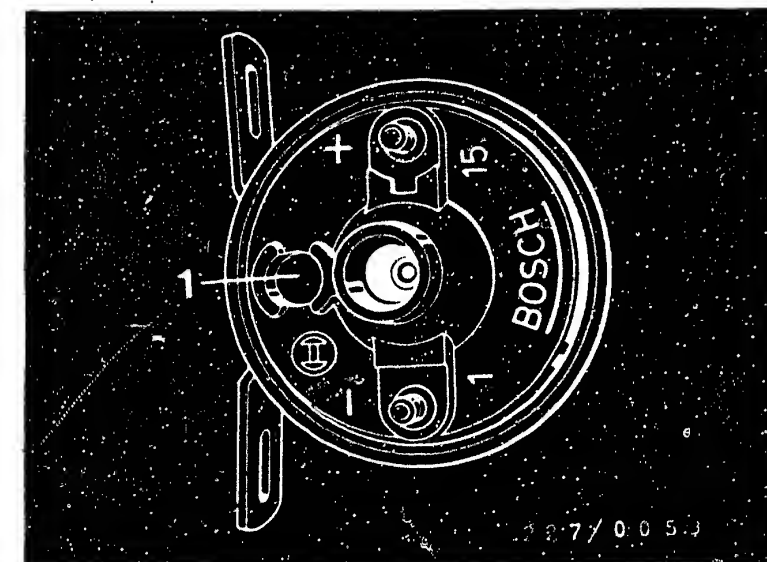
Replace the trigger box.  
Test completed.  
Tests as from B 5 not necessary.

Please note: If the customer complaint is still present, then there are other faults in the fuel system or the engine is not mechanically in order.

no

1. Vent plug not present or sealing compound has leaked out. Then replace trigger box and ignition coil.

2. If resistance values are not OK, then replace the ignition coil.



1 = Vent plug

**C5**

Trouble-shooting program  
Mercedes-Benz



**C6**

Trouble-shooting program  
Mercedes-Benz



# After-sales Service

## Technical Bulletin

Only for use within the Bosch organization. Not to be communicated to any third party.

22

### Danger of Accident on Semi-conductor Ignition Systems

VDT-I-227/102 B

11.1976

Please be sure to pass this bulletin on to your employees for their attention.

The increased demands made on their ignition systems by modern engines, and the wish for freedom from maintenance, led some time ago to manufactures starting to equip their vehicles with semi-conductor ignition systems as original equipment. In most cases the performance of nearly all makes of such systems is higher than that of conventional systems, and further improvements are to be expected. This means that semi-conductor ignition systems have reached the point where contact with "live" ports or contacts (whether on the primary side or the secondary side) can prove fatal.

In this connection we should like to point out to you that the laws valid in your country regarding work on high-voltage systems must be adhered to when working on, or testing, semi-conductor ignition systems.

As a matter of principle, when working on such ignition systems the ignition is to be switched off. Included in such work are the following operations:

- Connection of engine testing equipment (timing light, dwell-tach tester, ignition oscilloscope etc.).
- Replacement of ignition system parts (spark plugs, ignition coil, ignition distributor, H.T. ignition cables etc.).

If it is necessary to switch on the ignition in order to test the system or make adjustments on the engine (to the carburetor for instance), then lethal voltages are present throughout the entire system.

This means that the danger of accident exists not only at individual components in the system (e.g. ignition distributor, ignition coil, trigger box, ignition harness), but also at the wiring harness (e.g. connection for the tachometer, diagnostic connector), on terminals, and on test equipment.

**BOSCH**

Geschäftsbereich KH Kundendienst, Kfz-Ausrüstung.  
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**L1**

Technical Bulletin

Mercedes-Benz

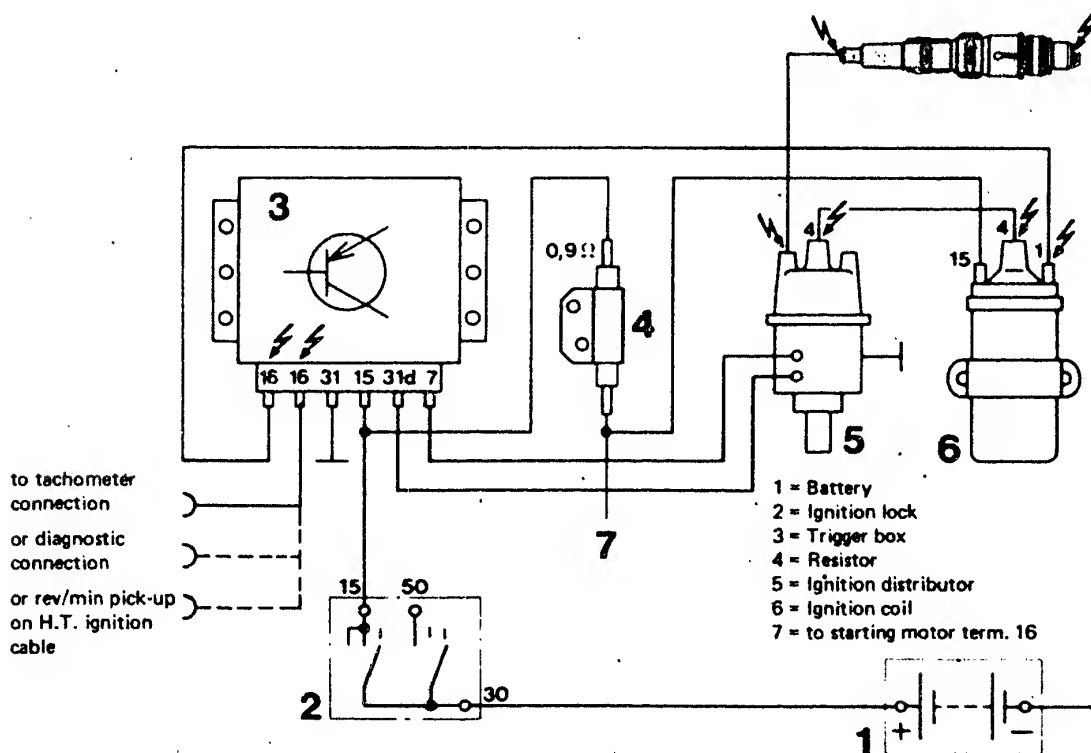


In addition, in the case of the capacitor-discharge ignition system (CDI), danger of accident is also present under the following circumstances:

- Operation of the trigger box without the ignition transformer.
- At the trigger box, (removed), relatively soon after it has been switched off (capacitor discharge).

Below is a typical terminal diagram of a semi-conductor ignition system, the danger points are marked with red high-voltage arrows. We would point out that all semi-conductor ignition systems, even the older ones, are to be regarded as dangerous in the sense as defined by this bulletin.

Please address any queries or comments concerning the contents of this publication to our representative in your country.



Terminal diagram

# After-sales Service

## Technical Bulletin

Only for use within the Bosch organization. Not to be communicated to any third party.

EFFECTS OF ELECTRICAL AND ELECTRONIC  
SYSTEMS ON HEART PACEMAKERS

VDT-I-227/107 En

1.1981

e.g. ignition systems, Jetronic, Motronic, ABS

Please ensure without fail that this Bulletin is passed on to your employees for their attention!

We have often been asked by some of our customers whether or not patients with heart pacemakers are endangered in any way by ignition systems. This theme was recently the subject of an examination carried out by the Ignition System Development Department of Robert Bosch GmbH in conjunction with Dr. Thull, lecturer at the Central Institute for Biomedical Technology at the University of Erlangen-Nürnberg and Biotronic GmbH & Co. of Berlin, a manufacturer of heart pacemakers. The magazine "Biomedizinischen Technik" (5/80) listed the results.

The most important discoveries in this practice can be summarized from the examination report as follows:-

1. Heart pacemakers corresponding to the latest state of the art are not affected by radiation (electromagnetic fields) from ignition systems.
2. With a stationary engine and the ignition switched off the heart pacemaker is not affected by any part of the ignition system, even when unintentionally touched. Maintenance work in the engine compartment, for example, can then be carried out without any danger.
3. With the engine running or stationary with the ignition switched on, touching current-carrying parts of the ignition system, as well as parts of any other electrical system, presents a certain danger for everybody. The heart pacemaker can here be affected under certain conditions (voltage, current and frequency). Patients with heart pacemakers should therefore at all costs avoid touching current-carrying parts of electrical systems.
4. Furthermore, patients with heart pacemakers are more inclined to psychic shock effects than other people, even when they receive just a harmless electric shock, because many such patients are conscious of the increased danger to the cardiac activity.

We therefore consider it inadvisable for patients with heart pacemakers to be employed in workshops or on vehicles where ignition systems are being tested or repaired. If any members of your staff have heart pacemakers please carry out the necessary measures.

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**L3**

Technical Bulletin

Mercedes-Benz



We would like to add that heart pacemakers are not expected to be affected in any way by interference from other electronic products and systems which we manufacture, such as the Antiskid System (ABS), Jetronic, Motronic, because the much greater radiation intensity of the ignition systems examined in normal use has not caused any interference to heart pacemakers corresponding to the latest state of the art.

If you should receive questions on this matter from customers, please inform them accordingly.



# After-sales Service

## Technical Bulletin

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### NEW DESIGNATIONS FOR IGNITION SYSTEMS

VDT-I-227/108 En

5.1981

The introduction of new ignition systems has made it necessary to reclassify all designations.  
The designations listed below will be used immediately in KH workshops and in sales literature.

Designation	Abbreviated code	Meaning	Switching part	Ignition control and spark advance	High-voltage distribution
Coil ignition	SZ (CI)	-----	mechanical (breaker points)	mechanical (ignition distributor)	mechanical (ignition distributor)
Transistorized coil ignition	TSZ-k (TCI-c)	k=breaker-triggered	electronic (trigger box)	mechanical (ignition distributor)	mechanical (ignition distributor)
Trigger box with traditional switching techniques	TSZ-I* (TCI-i)	I=induction type pulse generator	electronic (trigger box)	mechanical (ignition distributor)	mechanical (ignition distributor)
	TSZ-H (TCI-h)	H=Hall generator	electronic (trigger box)	mechanical (ignition distributor)	mechanical (ignition distributor)
Transistorized ignition (Trigger box in hybrid technique)	TZ-I* (TI-i)	I=induction type pulse generator	electronic (trigger box)	mechanical (ignition distributor)	mechanical (ignition distributor)
	TZ-H* (TI-h)	H=Hall generator	electronic (trigger box)	mechanical (ignition distributor)	mechanical (ignition distributor)

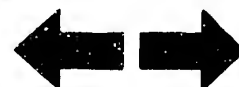
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Designation	Abbreviated code	Meaning	Switching part	Ignition control and spark advance	High-voltage distribution
Electronic ignition	EZ-L	L=characteristic curve	electronic (trigger box or control unit)	electronic (control unit)	mechanical (ignition distributor)
	EZ-F	F=ignition map	electronic (trigger box or control unit)	electronic (control unit)	mechanical (high-voltage distributor)
Distributorless semiconductor ignition	VZ-L	L=characteristic curve	electronic (control unit)	electronic (control unit)	electronic (two-spark ignition coil, or 1 ignition coil/spark plug)
	VZ-F	F=ignition map	electronic (control unit)	electronic (control unit)	electronic (two-spark ignition coil, or 1 ignition coil/spark plug)

\* Please note: The ignition system can additionally be fitted with a DLS unit (digital idle stabilizer) or with an ELS unit (electronic idle stabilizer) or with an ESV unit (electronic ignition retardation).



# After-sales Service

## Motor Vehicle Service Information

Only for use within the Bosch organization. Not to be communicated to any third party.

INCORRECT DISPLAY OF ROTATIONAL SPEED AND  
DWELL ANGLE ONLY WITH TRIGGER BOXES  
0 227 100 ... (TCI-i, TCI-h) WITH CURRENT  
LIMITATION

VDT-I-Gen. 030 En  
6.80  
Supersedes Ed. 3.80

For additional information see VDT-I-Gen. 032 En

### 1. General

In comparison with conventional ignition systems, transistorized ignition systems with current limitation have different primary voltage characteristics. During the dwell period the voltage at terminal 1 of the ignition coil may assume values from 1.5 V to battery voltage (or greater). This may lead to an incorrect display of rotational speed and dwell angle when testing the ignition system. However, there is no functional defect in the ignition system, and, for this reason, the trigger box must not be replaced. Incorrect displays may occur with the testers listed below:

MOT 001.00}	Rotational-speed	KTE 001.00
001.01}	display O.K. with these	001.02
001.02	testers	001.03
001.04		
002.00		

By now, the following vehicles may be fitted with breakerless ignition systems with current limitation:

Audi	(Bosch/Fairchild-ignition system)	Mazda	(Mitsubishi ignition system)
BMW	(Bosch ignition system)	Mitsubishi	(Mitsubishi ignition system)
Citroen	(Delco ignition system)	Nissan-Datsun	(Hitachi ignition system)
Fiat	(Delco ignition system)	Peugeot	(Bosch ignition system)
Ford	(Delco ignition system)	VW	(Bosch/Fairchild ignition system)
General-Motors	(HEI-ignition system)	Bosch transistorized ignition system for retrofitting 0 227 100 920	

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**L7**

Service Information

Mercedes-Benz



## 2. Test instructions

### 2.1 Rotational speed

Incorrect rotational-speed display can be recognized as follows:

If one starts at the idle speed and slowly increases the engine speed, then the incorrect display can be recognized by an abrupt reduction in the rotational-speed display (e.g. from 2400 min<sup>-1</sup> to 1200 min<sup>-1</sup>).

It is, however, possible to attain correct rot.-speed measurements as follows:

Connect a ballast resistor of 0.9 or 1.0 Ohm (see Fig.) in series in the line to term. 15 of the ignition coil (take care not to cause a short circuit). After the rotational-speed measurement, the ballast resistor must be removed (otherwise starting difficulties and misfiring). Connect tester as per operating instructions.

### Suggestion for user manufacture

Required parts:

- 1 ballast resistor 0.9 Ohm  
or
- 1 ballast resistor 1.0 Ohm
- 2 blade receptacles e.g.  
approx. 0.2 m cable, 1.5 mm<sup>2</sup> e.g.
- 2 insulated clips

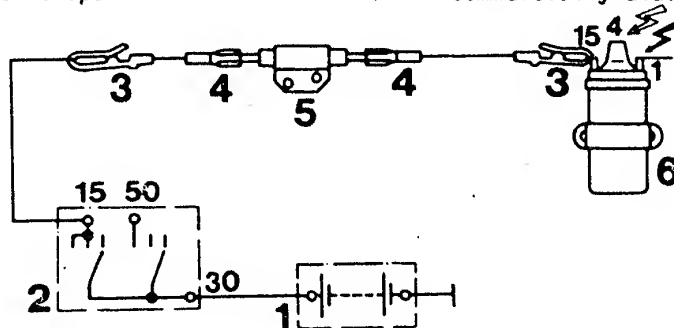
Part No. 0 227 900 002

Part No. 0 227 900 101

Part No. 1 901 355 881

Part No. 6 210 150 150

Commercially available



1 = Battery

2 = Ignition switch

3 = Clips

4 = Blade receptacle

5 = Ballast resistor

6 = Ignition coil

⚡ approx. 400 V

⚡ approx. 25 kV

### 2.2 Dwell angle

The dwell angle is electronically controlled. A measurement of the dwell angle is no longer performed.

### 2.3 Ignition point

Is displayed correctly. Connect tester as per operating instructions.



# After-sales Service

## Motor Vehicle Service Information

Only for use within the Bosch organization. Not to be communicated to any third party.

### MOTORTESTER CONVERSION

Incorrect display of rotational speed,  
dwell angle and ignition point  
only with trigger boxes  
0 227 100 ... (TCI-i, TCI-h) with current  
limitation

VDT-I-Gen. 032 En  
6.80

For additional information see VDT-I-Gen. 030 of 6.80

Re.: Motortester EFAW 268  
268 S 10  
269  
214 B  
AE 2000

#### 1. General

Please make sure that the above-mentioned motortesters in your workshop and at your customers (e.g. motor vehicle workshops, oil companies, gas stations, vocational schools etc.) are converted. The conversion is subject to payment and is carried out by the K7 after-sales service of the responsible BG. The standard time is 15 work units (with fitting of switch).

#### 2. Why motortester conversion?

In comparison with conventional ignition systems, transistorized ignition systems with current limitation have different primary voltage characteristics. During the dwell period the voltage at terminal 1 of the ignition coil may assume values from 1.5 V to battery voltage (or greater). This may lead to an incorrect display of rotational speed and dwell angle as well as to incorrect triggering of the meter when testing the ignition system. There is, however, no functional defect in the ignition system, and, for this reason, the trigger box must not be replaced. Since, with the above-listed motortesters, the timing light is triggered by the signal path dwell angle - meter, this incorrect triggering also leads to incorrect flashing and thus to an incorrect display of the advance angle.

#### 3. Conversion measures

The situation is to be remedied by modifying the wiring of the testers so that the timing light is triggered by the clamp-on induction pickup and the pulse shaper stage.

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**L9**

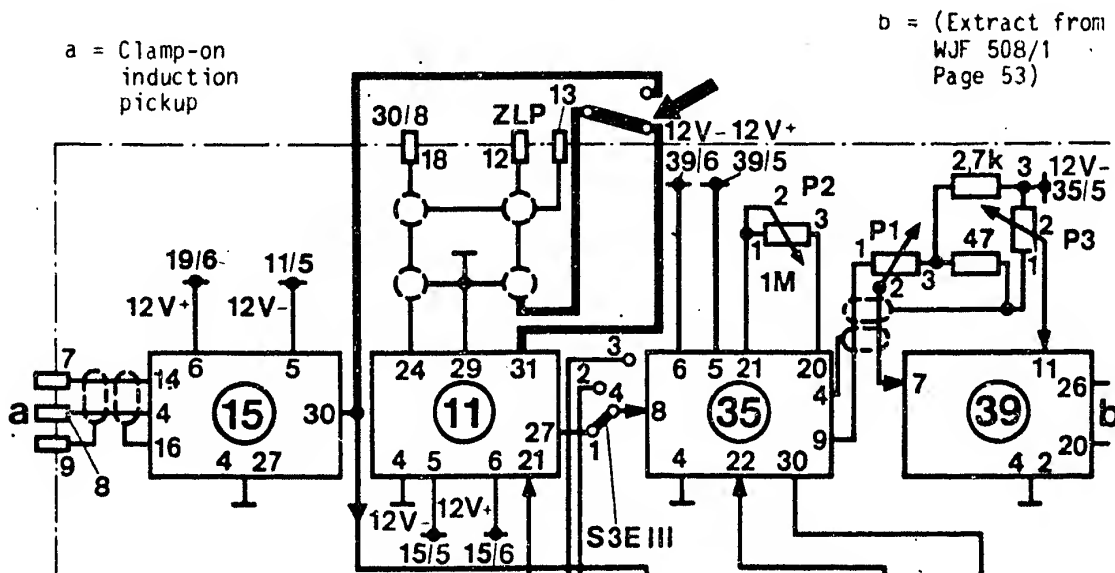
Service Information

Mercedes-Benz



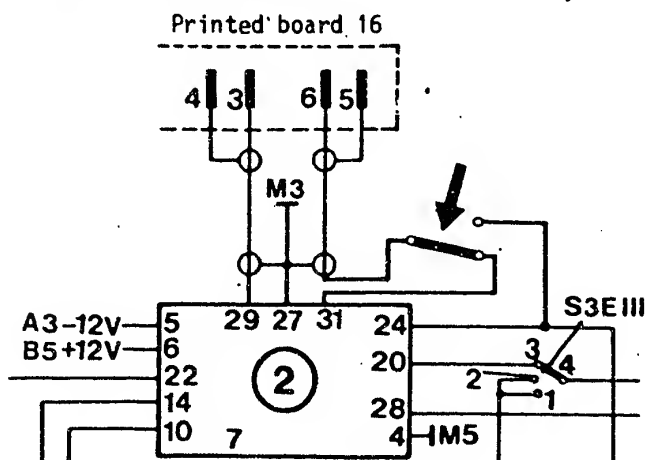
Remove the line of the ZLP\* from pin 31 of printed board 11 (coupling stage) and connect to pin 30 of printed board 15 (pulse shaper stage) via a switch with change-over contact (e.g. 0 341 500 803). In addition, a new line must be connected from pin 31 of printed board 11 to the other contact of the switch with change-over contact. Arrow points to switch with change-over contact.

\* ZLP = timing light



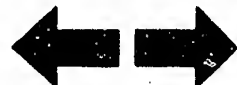
## EFAW 214 B

Remove the line from terminal 6 of printed board 16 to pin 31 of printed board 2 (coupling stage) and connect to pin 24 of the same printed board via a switch with change-over contact (e.g. 0 341 500 803). In addition, a new line must be connected from pin 31 of printed board 2 to the other contact of the switch with change-over contact. Arrow points to switch with change-over contact.



(Extract from WJF 503/1, Page 64)

By fitting the switch with change-over contact in the front panel of the motor-tester, it is possible to switch over from standard ignition systems to those with current limitation. We recommend that the switch positions be marked correspondingly: e.g. "standard" - "current limitation". These conversion measures have already been published in the K7 information sheet KJF 28/7911.



#### 4. Test instructions

##### 4.1 Standard ignition systems

Switch position: "standard"

All other tester connections as per operating instructions.

##### 4.2 Ignition systems with current limitation

Switch position: "current limitation"

In order to trigger the timing light, the induction-type pulse generator (clamp-on pickup or red pickup) must always be connected during the measurement.

The selector switch for ignition systems built into the motortester must be switched to standard coil ignition (not to TCI) with these ignition systems.

All other tester connections as per operating instructions.

The dwell angle is electronically controlled. A measurement of the dwell angle is no longer performed.



# After-sales Service

## Motor Vehicle Service Information

Only for use within the Bosch organization. Not to be communicated to any third party.

TESTS ON ELECTRONIC IGNITION SYSTEMS  
(TCI, TZ)  
TESTER INSTRUCTIONS

VDT-I-Gen. 035 En  
3.1981

The following tests are listed in older and current Tester operating instructions or in Trouble-shooting with the oscillograph:

- "Separate ignition coil test" (concerns EFAW 213, 214, 268, AE 2000).
- "Calculating the "ignition voltage reserve" (concerns EFAW 213, 214; 268, AE 2000 and MOT series).
- "Intensified insulation test" (concerns EFAW 213, 214, 268, AE 2000 and MOT series).

Nowadays transistorized ignition systems deliver more than 30,000 V secondary voltage.

To avoid damage to ignition coil, ignition cable and ignition distributor by voltage flashovers, the tests listed above should not be carried out on transistorized ignition systems.

The contents of this Service Information has already been published in the K7-Information K7-VJF 17/8012.

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Service Information  
Mercedes-Benz



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